

EXPRESS MAIL NO.: EL988725562US
DEPOSITED ON: November 24, 2003

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : Not Yet Assigned Conf. No.: N/A
Applicant(s) : Daniel E. Resasco, Walter E. Alvarez,
Jose E. Herrera and Leandro Balzano
Filed : Herewith
TC/A.U. : 1754
Examiner : P. Lish
Title : METHOD AND CATALYST FOR PRODUCING
SINGLE WALLED CARBON NANOTUBES

Docket No. : 7356.005
Customer No. : 30589

MS Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

**List of Sections Forming Part of This
Information Disclosure Statement**

The following sections are being submitted for this Information Disclosure Statement:

1. ☒ Preliminary Statements
2. ☒ Form PTO-1449 (Modified)
3. ☐ Statement as to Information Not Found in Patents or Publications
4. ☒ Identification of Prior Application in Which Listed Information Was Already Cited and for Which No Copies Are Submitted or Need Be Submitted

- 5. ☒ Copies of Listed Information Items Accompanying this Statement
- 6. ☒ Identification of Person(s) Making this Information Disclosure Statement

Section 1. Preliminary Statements

Applicants submit herewith patents, publications or other information of which they are aware, which they believe may be material to the examination of this application and in respect of which there may be a duty to disclose.

The filing of this information disclosure statement shall not be construed as a representation that a search has been made (37 C.F.R. § 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability or that no other material information exists.

The filing of this information disclosure statement shall not be construed as an admission against interest in any manner. Notice of January 9, 1992, 1135 O.G. 13-25, at 25.

Section 2. Form PTO-1449 (Modified)

☒ A Completed Form PTO-1449 (Modified) is attached hereto.

Section 3. Statement as to Information Not Found in Patents or Publications (Information Not Listed in Form PTO-1449 (Modified))

Section 4. Identification of Prior Application in Which Listed Information Was Already Cited and for Which No Copies Are Submitted or Need Be Submitted

This application relies, under 35 U.S.C. § 120, on the earlier filing date of prior application Serial No. 10/118,834, filed on April 8, 2002 (date).

(complete the following, if applicable)

- ☒ This application also relies, under 35 U.S.C. 120, on the earlier filing date of prior application Serial No. 09/938,847, filed on November 19, 2001 (date).

Section 5. Copies of Listed Information Items Accompanying this Statement

Legible copies of all items listed in Form PTO-1449 (Modified) accompany this information disclosure statement.

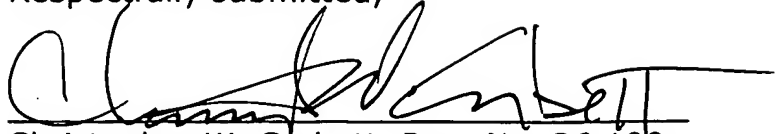
- ☐ Exception(s) to above:
- ☐ Items in prior application from which an earlier filing date is claimed for this application, as identified in Section 4.
- ☐ Cumulative patents or publications identified in Section 5.

Section 6. Identification of Person(s) Making this INFORMATION DISCLOSURE STATEMENT

The person making this statement is the attorney who signs below on the basis of the information:

- ☐ supplied by the inventor(s)
- ☐ supplied by an individual associated with the filing and prosecution of this application (37 C.F.R. § 1.56(c)).
- ☒ in the attorney's file

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Christopher W. Corbett", written over a horizontal line.

Christopher W. Corbett, Reg. No. 36,109

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Date Deposited: 11/24/2003

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

Complete if Known	
Application Number	Not Yet Assigned
Filing Date	Herewith
First Named Inventor	Daniel E. Resasco et al.
Group Art Unit	1754
Examiner Name	P. Lish
Attorney Docket Number	7356.005

(use as many sheets as necessary)

U. S. PATENT DOCUMENTS

EXAM INIT.	Cite No. 1	<u>U.S. PATENT NUMBER</u> Number	Kind Code ² (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD- YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA	3746657		Miller et al.	07/17/1973	
	AB	4456694		Blaskie et al.	06/26/1984	
	AC	4574120		Thompson	03/04/1996	
	AD	4663230		Tennent	05/05/1987	
	AE	5165909		Tennent et al.	11/24/1992	
	AF	5227038		Smalley et al.	07/13/1993	
	AG	5300203		Smalley	04/05/1994	
	AH	5405996		Suzuki et al.	04/11/1995	
	AI	5482601		Ohshima et al.	01/09/1996	
	AJ	5543378		Wang	08/06/1996	
	AK	5556517		Smalley	09/17/1996	
	AL	5560898		Uchida et al.	10/01/1996	
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	BA	5603907		Grochowski	02/18/1997	

U. S. PATENT DOCUMENTS

EXAM INIT.	Cite No. 1	U.S. PATENT NUMBER Number	Kind Code ² (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD- YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	BB	5648056		Tanaka	07/15/1997	
	BC	5641466		Ebbesen et al.	06/24/1997	
	BD	5695734		Ikazaki et al.	12/09/1997	
	BE	5698175		Hiura et al.	12/16/1997	
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	BG	5744235		Creehan	04/28/1998	
	BH	5753088		Olk	05/19/1998	
	BI	5773834		Yamamoto et al.	06/30/1998	
	BJ	5780101		Nolan et al.	07/14/1998	
	BK	5814290		Niu et al.	09/29/1998	
	BL	5877110		Snyder et al.	03/02/1999	
	BM	5965267		Nolan et al.	10/12/1999	
	BN	5985232		Howard et al.	11/16/1999	
	BO	5997832		Lieber et al.	12/07/1999	
	BP	6333016		Resasco et al.	12/25/2001	
	BQ	6413487		Resasco et al.	07/02/2002	

FOREIGN PATENT DOCUMENTS

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		Office 3 known)	Number 4	Kind Code ⁵ (if			
	CA		PCT/US00/15362		International Search Report	10/17/2000	

FOREIGN PATENT DOCUMENTS

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		Office 3 known)	Number 4	Kind Code ⁵ (if				
	CB		PCT/US02/23155		International Search Report	07/21/2003		
	CC		WO 97/09272		PCT/US	03/13/1997		
	CD		WO 98/39250		PCT/US	09/11/1998		
	CE		WO 00/73205		PCT/US	12/07/2000		
	CF		WO 98/42620		PCT/JP	10/01/1998		A
	CG		WO 00/17102		PCT International Publication	03/30/2000		
	CH		406122489		Japan	05/1994		X

U.S. and Foreign: ¹Unique citation designation number. ²See attached Kinds of U.S. Patent Documents. ³Enter Office that issued the document, by the two-letter code (WIPO Standard St.3). ⁴Form Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard St. 16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

NON PATENT DOCUMENTS

EXAM INIT.		Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published
	DA	ALVAREZ, ET AL., "Synergism of Co and Mo in the catalytic production of single-wall carbon nanotubes by decomposition of CO", <i>Elsevier Science Ltd.</i> , Carbon 39 (2001), pp. 547-558.
	DB	ANDERSON et al., "50 nm Polystyrene Particles via Miniemulsion Polymerization", <i>Macromolecules</i> , American Chemical Society, vol. 35, pp. 574-576, 2002.
	DC	BANDOW ET AL., "Effect of the Growth Temperature on the Diameter Distribution and Chirality of Single-Wall Carbon Nanotubes", <i>The American Physical Society</i> , Physical Review Letters, Vol. 80, No. 17, (1998), pp. 3779-3782.
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	DE	BOWER et al., "Deformation of Carbon Nanotubes in Nanotube-Polymer Composites", Applied Physics Letters, vol. 74, no. 22, pp. 3317-3319, 05/31/1999.
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EXAM INIT.		<p style="text-align: center;">NON PATENT DOCUMENTS</p> <p style="text-align: center;">Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published</p>
	EB	DAI et al., "Single-Wall Nanotubes Produced By Metal-Catalyzed Disproportionation of Carbon Monoxide", Chemical Physics Letters, vol. 260, pp. 471-475, 09/27/1996.
	EC	Database, Accession No. 1999-366878, Cano, "Canon KK", XP-002149235, 05/25/1999.
	ED	DE BOER ET AL., "The cobalt-molybdenum interaction in CoMo/SiO ₂ catalysts: A CO-oxidation study", <i>Elsevier Science Ltd.</i> , Solid State Ionics 63-65 (1993), pp. 736-742.
	EE	DENG et al., "Hybrid Composite of Polyaniline Containing Carbon Nanotube", Chinese Chemical Letters, vol. 12, pp. 1037-1040, 2001.
	EF	FONSECA et al., "Synthesis of single-and multi-wall carbon nanotubes over supported catalysts", Applied Physics A, vol. 67, pp. 11-22, 1998.
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	EI	GONG et al., "Surfactant-Assisted Processing of Carbon Nanotube/Polymer Composites", Chemical Material, vol. 12, pp. 1049-1052, 2000.
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	FA	HERNADI et al., "Catalytic synthesis of carbon nanotubes using zeolite support", Elsevier Science Inc. 1996.
	FB	HWANG et al., "Carbon nanotube reinforced ceramics", Journal of Materials Chemistry, vol. 11, pp. 1722-1725, 2001.

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	FC	HYPERION CATALYSIS INTERNATIONAL Website; http://www.fibrils.com/esd.htm ;"Unique Slough Resistant SR™ Series ESD Thermoplastic Product Line Offers Reduced Particle Contamination For Demanding Electronic Applications," and Hyperion Homepage http://www.fibrils.com .
	FD	IJIMA, "Helical Microtubules of Graphitic Carbon", Letters to Nature, vol. 354, pp. 56-58, 11/07/1991.
	FE	IJIMA et al., "Single-Shell Carbon Nanotubes of 1-nm Diameter", Letters to Nature, vol. 363, pp. 603-605, 06/17/1993.
	FF	IVANOV et al., "The Study of Carbon Nanotubes Produced by Catalytic Method", Chemical Physics Letters, vol. 223, pp. 329-335, 1994.
	FG	JIN et al., "Alignment of Carbon nanotubes in a polymer matrix by mechanical stretching", Applied Physics Letters, vol. 73, no. 9, pp. 1197-1199, 08/31/1998.
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	FK	LANDFESTER et al., "Miniemulsion polymerization", 6/4/2003, http://www.mpikg-golm.mpg.de/kc/landfester/ , 1-22
	FL	LANDFESTER, "Polyreactions in Miniemulsions", Macromol. Rapid Commun., vol. 22, no. 12, pp. 896-936, 2001.
	GA	LANDFESTER, "The Generation of Nanoparticles in Miniemulsions", Advanced Materials, vol. 13, no. 10, pp. 765-768, 05/17/2001.
	GB	LI et al., "Large-Scale Synthesis of Aligned Carbon Nanotubes", Science, vol. 274, pp. 1701-1703, 12/06/1996.

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	GC	McCARTHY et al., "A Microscopic and Spectroscopic Study of Interactions between Carbon Nanotubes and a Conjugated Polymer", J. Phys. Chem. B, vol. 106, pp. 2210-2216, 2001.
	GD	NIYOGI et al., Communications to the Editor, "Chromatographic Purification of Soluble Single-walled Carbon Nanotubes (s-SWNTs)", J. Am. Chem. Soc., vol. 123, pp. 733-734, 2001.
	GE	POMPEO et al., "Water Solubilization of Single-Walled Carbon Nanotubes by Functionalization with Glucosamine", Nano Letters, American Chemical Society, vol. 2, no. 4, pp. 369-373, 2002.
	GF	QIAN et al., "Load transfer and deformation mechanisms in carbon nanotube-polystyrene composites", Applied Physics Letters, American Institute of Physics, vol. 76, no. 20, pp. 2868-2870, 05/15/2000.
	GG	RAZAVI, "Metallocene catalysts technology and environment", Chemistry 3, pp. 615-625, 2000.
	GH	RINZLER et al., "Large-Scale Purification of Single-Wall Carbon Nanotubes: Process, Product, and Characterization," Applied Physics A, vol. 67, pp. 29-37, 1998.
	GI	SEARS et al., "Raman scattering from polymerizing styrene. I. Vibrational mode analysis ^{a)} ", J. Chem. Phys., vol. 75, no. 4, pp. 1589-1598.
	GJ	SHAFFER et al., "Fabrication and Characterization of Carbon Nanotube/Poly (vinyl alcohol) Composites**", Advanced Materials, vol. II, No. 11, pp. 937-941, 1999.
	GK	THESS et al., "Crystalline Ropes of Metallic Carbon Nanotubes", Science, vol. 273, pp. 483-487, 07/26/1996.
	GL	TIARKS et al., "Encapsulation of Carbon Black by Miniemulsion Polymerization", Macromol. Chem. Phys., vol. 202, pp. 51-60, 2001.
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	HB	WILLEMS et al., "Control of the outer diameter of thin carbon nanotubes synthesized by catalytic decomposition of hydrocarbons", Chemical physics Letters, vol. 317, pp. 71-76, 01/28/2000.
	HC	Yakobson et al.; "Fullerene Nanotubes: C _{1,000,000} and Beyond," American Scientist, vol. 85, pp. 324-337, Jul-Aug 1997.
	HD	ZHAO, et al., "Chromatographic Purification and Properties of Soluble Single-Walled Carbon Nanotubes", American Chemical Society, Page Est: 4.1, pp. A-E, 02/22/2001.
	HE	ZHU et al., "Direct Synthesis of Long Single-Walled Carbon Nanotube Strands", Science, vol. 296, pp. 884-886, 05/13/2002.
	HF	US 20020165091 A1, Resasco et al., Publication Date 11/07/2002.
	HG	US 20020127169 A1, Smalley et al., Publication Date 09/12/2002.
	HH	US 20010031900 A1, Margrave et al., Publication Date 10/18/2001.
Non Patent Documents: ¹ Unique citation designation number. ² Applicant is to place a check mark here if English language Translation is attached.		
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